

A REVIEW OF THE DESERT LEAFHOPPERS OF THE ORGERINI (RHYNCHOTA FULGORIDAE).

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Stal¹ in 1859, figured and described *Orgerius rhyparus* from material collected at San Francisco and for many years the relation of this species to the other members of the group remained an unsettled question. About ten years ago it chanced to be the good fortune of the senior writer while collecting Homoptera in California to rediscover Stal's species and secure sufficient material to throw some light on the interpretation of the characters and classification of this aberrant and interesting tribe of Fulgoridæ. Collections were made covering Oregon, Idaho, Utah, Nevada, California and Lower California, Mexico.

The adults of the Orgerini are wingless with brachypterous elytra and resemble the nymphs of winged species. They present a grotesque and unusual appearance in that they assume an upright position in walking on their long, slender legs; their short, stout bodies and their long, pointed cephalic processes together with a peculiar strut in locomotion give the insects a unique place among Nature's odd creatures. The rostrum is remarkably long, in some of the more upright species, exceeding the abdomen and instead of carrying it inclined forward as most leafhoppers do in feeding these insects feed with the rostrum running down the abdomen and extending beyond into the plant tissue. These odd adaptations seem to fit the insects to the hot, dry inhospitable desert regions of the Southwest and apparently is an arrangement to lift the body from the burning heat of the sands. Among the host plants recorded for the various species are some of the more common xerophytic vegetation such as Mormon tea, sage brush, tree Yucca and chaparral.

In 1909, the senior² writer published an account of some of the material he collected from this region proposing the genera *Timodema* and *Orgamara* with a number of new species. In 1913, Oshanin³ published a synopsis of the tribe *Orgerini* of the

¹ Freg. Eugen. Resa. Ins., p. 274, 1859.

² Ball, E. D., Proc. Bio. Soc. Wash., Vol. 12, pp. 197-204, Dec., 1909.

³ Oshanin, B. F., Insecta Hemiptera, Vol. 3, part 1, pp. 1-113, 1913.

Russian fauna. This was followed in the same year by a resume⁴ in German with the keys translated in Latin. It appears from the keys and descriptions that he has misinterpreted the character of the genus *Orgerius* as he describes it as wanting a callosity behind the eye while he erects the genus *Nymphorgerius* for species with short angular vertices and the eyes bearing posterior callosities. Stal's figure of *Orgerius* shows distinct callosities behind the eyes and our material also exhibits this character. Unfortunately, Oshanin had no American material for comparison and it is very unlikely that the genus *Orgerius* is represented in Europe. As some of the European genera appear to be closely related to our American genera we have attempted to state the differences here.

The genus *Sphenocratus* Horv. superficially resembles *Deserta* but differs from the known American genera in lacking ocelli. *Nymphorgerius* Oshanin resembles the true *Orgerius* but has the antennæ placed in a large pit with the margins elevated into a carina. Unless we misinterpret this character none of the known species in North America possess this peculiarity. *Haumavarga* Oshanin differs from all known American genera of this tribe in lacking a median carina on both vertex and pronotum. It bears no superficial resemblance to any of our species as the vertex is much broader and the angles very much rounded. *Repetekia* Oshanin has the anterior femora and tibia flattened as in *Timodema* Ball but has the median carina of the front divided by an obtuse fracture. *Timodema* in addition has the middle femora and tibia foliaceous. *Ototettix* Oshanin resembles *Timonidia* but has a distinctly different front resembling that of *Ticidia* Uhl. but may be separated from the latter genus by its broad head which is upturned at an angle of about 45°, while *Ticidia* and *Timonidia* have the head normal; also the species of *Ototettix* are not banded as are the species of *Ticidia* and *Timodema*. *Tigrahauda* Oshanin resembles *Acinaca* in the shape of the cephalic process but differs in having the oblique carina running parallel to the ventral margin of the cephalic process while in *Acinaca* the oblique carina curves abruptly upwards and ends on the dorsum. It also differs from *Acinaca* in having the vertex furrowed and wanting a median carina.

⁴ Oshanin, B. F., Rev. Rus. Ent. Vol. 13, No. 1, pp. 135-147, 1913.

KEY TO THE N. A. GENERA OF ORGERINI.

- A. Callosity behind eye; vertex elongate or angulate.
 B. Vertex elongate, with more than one-half its length beyond the eyes.
 C. Cephalic process truncate at the extremity. Five-angled.
 D. Cephalic process gradually tapering as seen from both top and side.
 Apex small.....*Orgamara* Ball.
 DD. Cephalic process parallel margined; apex as seen from the side slightly enlarged; projecting at an angle with vertex.....*Yucanda* nov. gen.
 CC. Cephalic process as seen from side, beak-like, the apex obliquely rounding from above, the lower angle slightly produced.....*Deserta* nov. gen.
 BB. Vertex angulate, narrowing from the eyes, less than twice the length of the eye.....*Orgerius* Stal.
 AA. No callosity behind eye; head rounding or if elongate, broad, if seen from the side.
 E. Vertex angulate, produced in front of the eyes at least one-third its length.
 F. Head twice the length of the eye as seen from the side, widening toward the truncate apex.....*Acinaca* nov. gen.
 FF. Eyes contiguous to pronotum; head distinctly less than twice the length of the eyes; as seen from the side, distinctly narrowing and roundly truncate.....*Aridia* nov. gen.
 EE. Vertex broad and short, scarcely longer than its basal width. The lateral carina of the front closely margins the eye clear to its juncture with the lateral margin of the vertex.
 G. Fore and middle tibia broadly foliaceous.....*Timodema* Ball.
 GG. Tibia normal.
 H. Lateral carinae of the frontal tablet uniting some distance below the apex of the head.....*Ticidia* Uhl.
 HH. Lateral carinae of the frontal tablet narrowing but not uniting before joining the vertex.....*Timonidia* nov. gen.

Orgamara Ball.

Resembling *Orgerius* Stal but with the vertex produced into a long stylate process, similar to that found in *Scolops*, but stouter.

Cephalic process long, tapering, nearly twice the length of the eye, truncate apically, but slightly inclined to the plane of the vertex. Front straight in profile, tricarinate, the lateral carinae narrowing near the apex but not uniting with the median. The carina from the lower corner of the eye running obliquely to the upper margin of the snout at or beyond the middle; below this carina, the front is pustulate. A transverse carina sets off the posterior third of the vertex; median carina of the vertex extending onto the cephalic process a slight distance. Eye separated from the pronotum by an elongate callosity. Pronotum with a central raised tablet, tricarinate, the lateral extensions sloping strongly downward and backward, pustulate. Elytra covering the second segment of the abdomen, irregularly reticulate; a row of pustules near the posterior border of each segment. Legs long, slender, terete; hind tibia with 5-6 weak spines. Rostrum about equalling the abdomen.

Type of the genus *O. acuta* Ball.

This genus as now restricted, with *acuta* Ball as type, includes two species known only from Southern California and Lower California, Mexico. The slender tapering cephalic process will at once separate them from other groups.

Key to the Species of Orgamara.

- A. Cephalic process long and slender, nearly twice as long as the eye; the anterior tablet of the vertex longer than wide.....*acuta* Ball
 AA. Cephalic process broader and shorter, extending beyond the eye, but little more than its length; anterior tablet of vertex rectangular...*reducta* Ball

Orgamara acuta Ball.

(Plate XII, Figs. 12, 14, 16.)

Orgamara acuta Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 198, Dec., 1909.

A short-winged, dark fuscous species with an extremely long and slender cephalic process. Length 5-6 mm.

Cephalic process long and slender more than twice as long as the eye. The oblique carina meeting the margin of the cephalic process about one-third the distance from the apex. Anterior tablet of the vertex slightly longer than wide. The front narrow, elongate, over one-half its length beyond the median line of the eyes.

Color—Brownish fuscous, pronotum much lighter than scutellum. Irregular reticulations on the elytra and about four irregular stripes on the abdomen, lighter. Whole insect with a coppery reflection along the median line. Face uniformly brown.

This species is strikingly distinct from all others in the group and may be recognized by its long, slender, pointed cephalic process. Specimens are at hand from the region of San Diego, California, and adjacent portions of Mexico. Solitary individuals have been taken from the middle of June until early August. They occur in open spaces in the chaparral, two of them were beaten from *Arctostaphylos* but this may have been accidental.

Orgamara reducta Ball.

Orgamara reducta Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 198, Dec., 1909.

Resembling *O. acuta*, slightly smaller, paler, with a shorter cephalic process. Length 4 mm.

Cephalic process broad, less than one and one-half times the length of the eye. Oblique carina meeting the dorsum at the middle. Front broader and shorter than in *acuta*, the median line of the eye bisecting its length.

Color—Pale gray, mottled with fuscous. The carinae on the vertex, the central plate of the pronotum, most of the elytra reticulations and four interrupted stripes on the abdomen creamy white. Front pale, slightly sprinkled with fuscous.

The stouter, lighter appearance and the shorter cephalic process will at once separate this species from *acuta*. Specimens are at hand from the Salton Sink region of California, taken late in June.

Yucanda nov. gen.

Cephalic process long, more than three times the length of the eye, parallel margined as seen from the side, curving upwards at an angle slightly less than 45° , widening toward the truncate tip, where it is five-angled. Front of equal width throughout, tricarinate, the lateral carinæ widening and the median carina elevated toward the apex of the cephalic process. Oblique carina extending two-thirds the length of the cephalic process, pustulate below. Pronotum narrow, pustulate, median tablet not differentiated. Eye separated from scutellum by an elongate callosity. Anterior tablet of scutellum raised, tricarinate, lateral projections pustulate. Elytra abbreviated, irregularly reticulate. Abdomen long, oval, obese. Rostrum definitely exceeds the abdomen. Legs long, slender; hind tibia with 4-5 weak spines.

This genus is readily distinguished from *Orgamara* by its curved and apically truncate cephalic process.

Type of genus *Orgamara albida* Ball.

Yucanda albida Ball.

(Plate XII, Figs. 2, 7.)

Orgamara albida Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 200, Dec., 1909.

A large globose creamy yellow species with a long curved cephalic process. Length 6-7 mm.

Structure of the genus, pale creamy yellow, the eyes, lateral carinæ, the antennæ, fore and middle tibia and the tip of the rostrum brownish.

This strikingly distinct species in both color and structure lives, both nymph and adult, upon the tree *Yucca* (*Yucca baccata*) of the Mojave desert region. These insects hide between the bases of the sword-like leaves where they are practically inaccessible except to vigorous beating with a heavy club. Adults were abundant together with a few large larvæ June 15 indicating that a brood was just maturing, while on another visit July 30 but one or two old adults could be found.

Deserta nov. gen.

Intermediate between *Yucanda* and *Orgamara* but with the apex of the cephalic process beaked.

Cephalic process moderately long, very nearly parallel margined to just before the apex where it rounds over to the acute and slightly pro-

duced lower angle which is curved down like the beak of a raptorial bird, the extremity triangular. Front broad and nearly parallel, the lateral carinæ widening toward the apex. Median carina of vertex extending the full length of the cephalic process. Central tablet of pronotum distinct. A definite oval or slightly oblique callosity behind the eye, separating it from the pronotum. The elytra brachypterous, irregularly reticulate. Legs simple; hind tibia with 7 strong spines.

Type of the genus *Orgamara bipunctata* Ball.

This group is distributed from southern Idaho to Mexico between the Wasatch and Sierra Nevada Mountains and extending across the latter range in Southern California. All the species of this group have been taken from sage brush regions and most of them have been beaten directly from species of *Artemesia*.

Key to the Species of Deserta.

- A. Part of the front above the center of the eyes twice as long as that below.
- B. Cephalic process as seen from above extending beyond eye less than twice the length of the eye. Lower angle of anal tube of male more than one and one-half times the dorsal length of the tube, broadly expanded and curved down to meet the long, narrow plates.
 - obscura* Ball
- BB. Cephalic process more than twice as long as the eye. Lower angle of anal tube of male narrower and less produced. *bipunctata* Ball
- AA. Part of the front above the center of the eyes equalling that below.
 - obesa* Ball

Deserta obscura Ball.

(Plate XII, Figs. 4, 11.)

Orgamara obscura Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 200, Dec., 1909.

Resembling *bipunctata*, darker with a shorter cephalic process. Length, females, 6 mm.; males, 5 mm. Ashy gray with a curved and slightly hooked process.

Cephalic process shorter and stouter than in *bipunctata*. Front with the median tablet expanded before the apex, rounding above. Part above the center of the eyes one-half longer than that below. Color—white, finely sprinkled with dark points, giving the insect an ashy gray appearance. Front greenish, the clypeus rusty orange.

Genitalia.—Lower half of anal tube in the male extended over one and one-half times the median length of the tube, broadly expanded and curved down to meet the margins of the long, narrow plates. Surface of the lower half furrowed and covered with coarse hairs.

This species has been taken on sage brush (*Artemesia tridentata*) at Nampa, Idaho, Wells, Nevada, Marysvale and Chadburn's, Utah, and Doyle and Chilcoot, California. Collections have been made all around this area, without finding the

species; it therefore appears to be confined to the State of Nevada and a narrow fringe of the adjoining states and only on the higher levels where sage brush grows. Nymphs and adults were found during July at the lower levels, adults were nearly all out by July 20 but in the mountains nymphs were still present up to early August, while adults were taken up until the last of the month.

***Deserta bipunctata* Ball.**

Orgamara bipunctata Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 199, Dec., 1909.

Resembling *obscura* but with a longer, slimmer, less inclined cephalic process about twice the length of the eye and lighter in color. Length, female, 6 mm.; male 5 mm.

Front with the central raised tablet distinctly narrowing before the eyes, then parallel margined to the clypeus. The part of the front above the center of the eyes almost double that below. Elytra shorter than in *obesa*, slightly abbreviated, truncate. Color—Variable, but usually a dull fuscous, finely irrorate with fuscous brown.

Examples are at hand from St. George, Utah, and Ravenna, California, probably on *A. tridentata*.

***Deserta obesa* Ball.**

Orgamara obesa Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 199, Dec., 1909.

Resembling *bipunctata* but smaller with a shorter, blunter cephalic process upturned at a sharper angle, slightly less than 45°. Length, female, 6 mm.; male, 5 mm.

Cephalic process slightly more than once the length of the eye. Elytra short, the inner angles broadly rounding. Front parallel margined, part above eyes but little larger than that below.

Color—Pale straw, with a dirty orange cast. Nervures of the elytra with the cells smoky, the nervures of a pale straw color.

This species has been taken at American Fork and Parowan, Utah, from sage brush in July and August.

***Orgerius* Stal.**

Resembling *Deserta*, but with a broader, shorter, distinctly triangular cephalic process.

Cephalic process short, broad at the base, tapering to an angular or slightly conical point, not truncate. The lateral carinae of the front rounding into the median carina at the apex of the cephalic process. Oblique carina curving upwards from the eye, pustulate below; median carina extending to the apex. Eye separated from the pronotum by a diamond-shaped callosity. The anterior margin of the lateral tablets

of pronotum transverse instead of inclined posteriorly as in *Deserta*. Carinae of scutellum sharply defined. Elytra brachypterous, irregularly reticulate. Abdomen obese, oval. Rostrum equalling the abdomen. Anterior femora expanded three times the width of the tibia; post tibia flattened, inclined to be serrate, the serrations crowned with 6-8 black spines.

This genus was described by Stal for *O. rhyparus* from San Francisco. Oshanin, 1913, in a review of the group evidently misinterpreted the character of the genus as he describes *Orgerius* as wanting a callosity behind the eye, while he erects a new genus, *Nymphorgerius*, for species with short, angular vertices and the eyes bearing posterior callosities. He mentions a carina between the antenna and the eye, which is lacking or but feebly developed in our species and it is probable that the true *Orgerius* does not occur in Europe.

Key to the Species of Orgerius.

- A. Size variable. Vertex narrow, one-half longer than its width; the hind tibia distinctly flattened basally, the heavy spines appearing as serrations. *O. rhyparus* Stal.
 AA. Small, pale, vertex wider, less than one-half longer than its basal width. Posterior tibia not modified. *O. minor* Ball

Orgerius rhyparus Stal.

Orgerius rhyparus Stal. Freg. Eugen. Resa. Ins., p. 274, 1859.

A large, obese, globose species with a long, acutely angular vertex extending one-half its length beyond the eye. Vertex long, parallel margined or widening near the base, then acutely angular, the apex slightly rounding, the lateral carinae strongly foliaceous. Face in profile slightly dished, forming with the vertex an acute angle. Median tablet narrow, parallel margined, about equalling the width of the eye.

This species appears to be extremely variable in size and color and is best characterized under its varieties. It was described by Stal from specimens from San Francisco and has been found to extend from Oregon to Mexico, west of the Sierra Nevada range. The larvæ appear in May and June, the adults in June and July. They are found in bare places in dry, exposed situations.

Key to Varieties.

- A. Large, obese forms, partly rufous or testaceous.
 B. Species entirely rufo-testaceous. *var. rhyparus* Stal.
 BB. Rufous with elytra black. *clitellus* n. var.
 AA. Without reddish shade.
 C. Uniformly fuscous, size variable.
 D. Large, obese, females, 5 mm. or longer. *concordus* n. var.
 DD. Small, females 4 mm. or less. *pajaronius* n. var.
 CC. Uniformly pale or fuscous and pale, small. *ventosus* n. var.

Variety **rhyparus** Stal.

(Plate XII, Fig. 15).

This variety is characterized by its rather uniform testaceous color and appears to be one of the rarer forms. It has been found in the foothills around the Sacramento and San Jauquin valleys and extending over the range towards the Salton Sink as far as Cabazon.

Variety **clitellus** n. var.

Resembling var. *rhyparus*, large, obese forms with a testaceous color sharply set off by the shining black elytra.

Described from three examples from Santa Margarita, Chico and Colfax, California. This variety was found with the preceding and appears to be a still rarer adaptation to these dry, hot situations.

Variety **concordus** n. var.

Large, obese form with the females averaging from 5-6 mm., uniform dull fuscous above, with a slightly pearl-gray sheen.

Described from two pairs from Cabazon, California, and Ti Juana, Mexico. This is the common variety in southern California extending from Visalia and Cabazon south and west to Ti Juana, Mexico.

Variety **pajaronius** n. var.

Small, rather slender, female not over 4 mm. in length, resembling *concordus* above but much smaller and with the face much more frequently transversely banded with light.

Described from two pairs from Salinas and Watsonville, California. This variety occurs on the Coast Range from the Salinas Valley north to San Francisco and a pair were taken on the eastern slope of the Sierra Nevadas near Le Grande, Oregon.

Variety **ventosus** n. var.

Resembling *pajaronius* in size and form, dimorphic in color, the female mottled fuscous and white, the central tablets of the pronotum and scutellum almost creamy, the face trifasciate with light. Male clear yellowish-white with a few fuscous spots on the lateral carinae of the vertex.

Described from three pairs from Mojava, California, taken July 30. This peculiar form appears to be strictly confined to the sparse vegetation of that windy and inhospitable desert region. Most of the specimens were beaten from a low, spiny white shrub.

Orgerius minor Ball.

(Plate XII, Figs. 1, 6, 9.)

Orgerius minor Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 202, Dec., 1909.

Resembling *rhyparus* but smaller, paler, with a shorter, broader vertex, two-thirds as wide as long, the foliaceous margins rounding into the blunt apex. Posterior tibia normal. Length 4.5 mm.

This species occurs in the desert region of southwestern Colorado and southern Utah, where it is found on the ground usually associated with some of the smaller salt bushes (*Atriplex* spp.).

Acinaca nov. gen.

Resembling *Yucanda* in structure, but with a very much smaller, shorter and more compressed cephalic process.

Cephalic process moderately long, strongly compressed, narrowing toward the apex; as seen from the side, flat and widens rapidly to a slightly rounding truncate apex, curving upwards, strongly inclined, much wider at apex than at base. The vertex is narrow, less than the width of the eye. The lateral carina of the face cuts the dorsum at one-third the distance to the apex. Median carina faint or wanting. Central tablet of front narrow, almost linear, tricarinate. No callosity behind eye, eye and pronotum widely separated. Pronotum very small, narrow, pustulate, the lateral extensions only represented by a narrow collar, a median but no lateral carinae, without a raised central tablet. Scutellum very small, with a single carina. Elytra brachypterous irregularly reticulate. Pustules on abdominal segments large, prominent and extending only half way to the median line. Rostrum equalling the abdomen in length.

Type of the genus *Acinaca lurida* sp. nov.

This genus may be distinguished from any other of the group by its simiter-shaped cephalic process.

Acinaca lurida sp. nov.

(Plate XII, Figs. 8, 10.)

A small, globose, highly ornamented green and brown species with a compressed cephalic process. Length, females, 3 mm.; males, 2.5 mm.

Cephalic process slightly longer than the eye, roundly truncate; its tip about five times as deep as wide. Vertex a narrow, slightly widening strip between the large round eyes. Dorsum of cephalic process long, triangular, equalling the vertex, inclined upwards at an angle of 45°. Front elongate, widening below the eyes which are slightly above the middle. Frontal tablet very narrow, almost linear, strongly

inflated just above the eyes. Pronotum scarcely more than half as long as the diameter of eye, sloping irregularly backwards to a mere collar. Scutellum very small without a defined tablet.

Color—Bright testaceous with the head and pronotum a bright green. A belt covering most of the elytra deepening anteriorly and encircling the insect below just back of antennæ, dark shining brown to black. The lateral carinæ, median carina of the front and the margins of the truncate cephalic process black-lined. Fore and middle tibia lineate with light.

Described from three pairs from Mojave, California, taken July 30, 1912. Other examples are at hand from Ravenna, California. This striking and easily recognized species was taken only on one of the chaparral bushes, *Eriogonum fasciculatum*, of the deserts and dry mountain slopes to which its color almost perfectly adapts it.

Aridia nov. gen.

Resembling *Acinaca*, but with a shorter, broader, more rounding cephalic process.

Cephalic process broad and short, rounding at the apex, slightly inclined upwards. Vertex broad, as wide as the eye, the median carina fades out before reaching the apex. Front narrow, with very sharply defined carinæ; median carina of the front uniting with the lateral carina in a five-sided figure. Frontal tablet linear, inflated just below the eyes. No callosity behind the eyes, the eye and pronotum contiguous. Pronotum short, with median carina, without a central tablet, pustulate. Scutellum with central tablet, with three sharply defined carinæ. Elytra brachypterous. Strongly reticulate. Abdomen ovate. Abdominal segments with a row of pustules along posterior margin two-thirds of the distance to the median line. Legs linear, not expanded.

Type of the genus *Orgerius compressus* Ball.

Key to the Species of Aridia.

- A. Cephalic process upturned at an angle of about 45°. Rostrum about equalling the abdomen.....*A compressa* Ball
 AA. Cephalic process flat or upturned but very slightly. Rostrum decidedly longer than abdomen.....*A. erecta* Ball

Aridia compressa Ball.

Orgerius compressus Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 202, Dec., 1909.

Resembling *erecta*, but with a longer, narrower more upturned cephalic process. Length 4 mm.

Cephalic process upturned at an angle of about 45°, slightly less than the length of the eye, acutely angular with apex truncate. Front narrower than in *erecta*, sharply carinated. Line through center of eyes cutting slightly above the middle. Vertex long, angulate with faint

median carina, lateral carina more sharply defined. The lateral carinae of the front rounding in and uniting with the median at the rather broad truncate apex, not joining the median carina of the vertex. Rostrum about equalling the abdomen. Grayish brown, abdomen smoky with a few irregular lines.

Examples are at hand from Helper and Marysvale, Utah, taken in July and August from sage brush (*Artemesia tridentata*) growing on the sunny slopes of the Wasatch Mountains at elevations of 7,000 to 8,000 feet.

Aridia erecta Ball.

(Plate XII, Fig. 3.)

Orgerius erectus Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 202, Dec., 1909.

Resembling *Orgerius minor*, but smaller and with a rounding cephalic process very slightly upturned. Length, 4 mm.

Cephalic process short, extending beyond the eye less than its length, rounded at the apex with a truncate tip. Front sharply carinated, narrow, the width about one and one-half times the short diameter of the eye, lateral carinae uniting with the median carina just before the truncate apex of head, median carina of the vertex not uniting with the median carina of the front. Vertex small, triangular, apex of the head as seen from side bluntly rounded, almost truncate, not curved upward as in *compressa*. Rostrum decidedly longer than abdomen. Pale smoky lined with brown; elytra dirty straw; abdominal segments smoky with irregular dark markings.

Examples are at hand from Reno, Nevada, Doyle, Chilcoot and Kelso, California, indicating a distribution for a long distance along the slopes of the Sierra Nevada Mountains. The larvæ were abundant in early June. Very few adults at low levels while they were about equally divided on the highest levels late in July. They were found on the ground in open places.

Timodema Ball.

Intermediate between *Aridia* and *Ticida* but with the anterior femur greatly expanded, foliaceous.

Cephalic process short, broad at the base, rounding at the apex, vertex tricarinate, shorter than eye, not extending to the apex of the head, with acutely angulate anterior margin, the median carina of the front uniting with the median carina of the vertex. Front broad, five carinate, median tablet tricarinate. Median carina of the front and cephalic process coalescing. Clypeus broad, distinctly tricarinate. No callosity between the eye and pronotum. Pronotum short without raised tablet, pustulate to the median carina. The central tablet of the

scutellum not pustulate, tricarinate. Elytra brachypterous, irregularly reticulate. Abdomen obese, oval. Abdominal segments with distinct median carina. Fourth, 5th and 6th segments with a row of pustules along the posterior margin for a part of their length. Rostrum equalling the abdomen. Fore and middle femora and tibia greatly expanded, foliaceous, carinated; basal part of tibia leaf-like, tapering. Hind tibia with four spines.

Timodema miracula Ball.

(Plate XII, Fig. 17.)

Timodema miracula Ball. Proc. Bio. Soc. Wash., Vol. XXII, p. 201, Dec., 1909.

Resembling *Ticidia cingulata* Uhl. but with the anterior and middle legs foliaceous, slightly larger, broad and darker, pitchy brown or black with two white spots on the elytra. Length 3.5-4 mm.

Cephalic process appearing only as a rounding margin to the vertex, extending less than its width beyond the eye. Vertex shorter than eye, with indistinct median carina, anterior third angulate. The line uniting the frontal tablet with vertex equalling only one-half the length of the vertex. Front short and broad, not extending beyond the eyes. Fore and middle femora broadly foliaceous on both margins longitudinally carinated. Tibia broadly foliaceous at the base, rapidly narrowing to the rather attenuate apex.

Color—Dark brown or black with a transverse line on the scutellum, the posterior margin of the elytra and the tips of the fore and middle tibia milky white, and a transverse band on the fore and middle tibia reddish. A transverse band of white across the base of the clypeus.

Examples of this curious species have been found at Ravenna, Ontario, Pasadena and Tia Juana, California, and in Lower California, Mexico. They occur only on the slopes of the mountain sides and have been found under the dense green-brush (*Adenostoma fasciculatum*) so common in the chaparral of these slopes. The adults appear late in June on the lower slopes while the larvæ will be common above. A month later the adults will be appearing near the tops of the ridges. Even the youngest stages of the larvæ have the foliaceous legs and present a ludicrous appearance, somewhat resembling a crab as they strut about.

Ticidia Uhler.

Ticidia Uhl., Trans. Md. Acad. Sc. I, p. 143, 1891.

Loxophora Van Duzee, Proc. Acad. Nat. Sci., Phila., LIX, pp. 469, 472, 1908.

Resembling *Timodema* Ball but smaller, with the fore and middle tibia normal, linear, not foliaceous.

Cephalic process short, broad at the base, with a round apex, vertex short, as long as the eye, margins carinate. Front five carinate, with median tablet tricarinate, the lateral carinae roundly uniting before the apex of the vertex. Clypeus broad, tricarinate. The eye set into the curve of the pronotum, without callosity. Pronotum short, transverse, without median tablet, entirely pustulate. Central tablet of the scutellum broad, without pustules. Elytra brachypterous, irregularly reticulate. Abdomen obese, oval. Abdominal segments with a row of pustules on the outer margin of the posterior two-thirds. Rostrum distinctly exceeding abdomen. Anterior and middle tibia linear, not foliaceous; hind tibia with 6-7 spines.

Type of the genus Tigidia cingulata Uhl.

Tigidia cingulata Uhl.

Tigidia cingulata Uhl., Trans. Md. Acad. Sc., I, p. 144, 1891.

Loxophora transversa Van Duzee, Proc. Acad. Nat. Sci., Phila., LIX, p. 473, 1908.

Resembling *Timodema miracula* but smaller and with the fore and middle tibia normal. A small oval species transversely banded with gray and white. Length, 3.5 mm.

Cephalic process short, extending only slightly in front of the curve of the eyes. Front broad, distinctly wider than the eye. The single carina above the frontal tablet nearly as long as the vertex. Vertex wider than long, not extending beyond the eyes, obtusely triangular, posterior third with a strongly carinated margin, median carina obscure or wanting. Legs normal, anterior and middle tibia not foliaceous.

Color—Ashy gray, transversely banded with fuscous and white as follows: A narrow light band across the scutellum, a broader one across the apical half of the elytra and a third across the apex of abdomen. There is a pitchy black band across the face just below the eyes, bordered below by an ivory white one.

This species is evidently widely distributed over the desert region of south Utah as it has been taken at various places from Moab to St. George, Utah. It also occurs in a number of situations in south California from Cabozon to Ravenna. In all cases it has been found strictly around open spaces in the desert regions. The only plant which occurs in all these locations is the bush atriplex (*A. Canescens*) and it has usually been found closely associated with this plant. Adults have been captured from June 10 in hot situations to August 10 in cooler ones.

Timonidia nov. gen.

Resembling *Ticidia*, but smaller with a larger and more sharply angled vertex and still wider front.

Cephalic process almost wanting. The apex of the vertex slightly exceeding the eyes. Vertex triangular clear to the base, median carina weak. Front broader than in *Timodema*, frontal tablet broad, scarcely elevated, parallel margined to just before the apex where the lateral carinae round in and unite with the vertex. Clypeus broader than in *Timodema*. No callosity between the eye and pronotum. Pronotum short, without raised tablet, pustulate throughout. Central tablet of scutellum broadening posteriorly without pustules. Elytra brachypterous, irregularly reticulate. Abdomen oval, abruptly terminating posteriorly, almost truncate. Abdominal segments pustulate as in *Ticidia*. Fore and middle tibia and femora linear, not foliaceous or expanded. Hind tibia with 2-4 weak spines. Rostrum equalling the abdomen.

Type of the genus *Timonidia solitaria* sp. nov.

Timonidia solitaria sp. nov.

(Plate XII, Figs. 5, 13.)

A small, globose, creamy yellow species. Length, female, 3.5 mm.; male, 3 mm.

Structure of the genus, vertex short, about equal to the eyes. Roughly equilaterally triangular with the apex extending to the apex of the head where it joins the lateral carinae of the front. Front broader than the width of the eye. Pale creamy yellow with a tawny tinge, eyes light brown.

Described from three examples from Mojave, California, taken July 30, on *Eriogonum fasciculatum* along with *Acinaca lurida*. This species superficially resembles *Orgerius rhyparus* var. *ventosus* but is quite distinct structurally. It is not well adapted to this plant in color and it is possible that this occurrence was accidental.

EXPLANATION OF PLATE XII.

The Figures of this plate were made with camera lucida by the junior author.

- Fig. 1. *Orgerius minor* Ball, lateral view of head.
- Fig. 2. *Yucanda albida* Ball, end of cephalic process.
- Fig. 3. *Aridia erecta* Ball, front.
- Fig. 4. *Deserta obscura* Ball, head, pronotum and scutellum.
- Fig. 5. *Timonidia solitaria* sp. nov. front.
- Fig. 6. *Orgerius minor* Ball, front.
- Fig. 7. *Yucanda albida* Ball, lateral view of head.
- Fig. 8. *Acinaca lurida* sp. nov., head, pronotum and scutellum.
- Fig. 9. *Orgerius minor* Ball, head, pronotum and scutellum.
- Fig. 10. *Acinaca lurida* sp. nov., lateral view of head.
- Fig. 11. *Deserta obscura* Ball, lateral view of head.
- Fig. 12. *Orgamara acuta* Ball, dorsal view without legs.
- Fig. 13. *Timonidia solitaria* sp. nov., head, pronotum and scutellum.
- Fig. 14. *Orgamara acuta* Ball, head, pronotum and scutellum.
- Fig. 15. *Orgerius rhyparus* var. *rhyparus* Stal., head, pronotum and scutellum.
- Fig. 16. *Orgamara acuta* Ball, lateral view of head.
- Fig. 17. *Timodema miraculata* Ball, 1st leg.